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INTERLOCKING DIRECTORATES: AN INTERORGANIZATIONAL REVIEW.(U)

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Interlocking Directorates: An
Interorganizational Review

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This paper reviews the literature on interlocking directorates for coordinating organizations which are horizontally (competitors) and vertically (buyers and sellers) interdependent. The review develops an interorganizational framework, specifies relevant dimensions of interlocking directorates (e.g. directionality, strength, directness and simultaneity) and scrutinizes available literature on the relationships between interdependence, interlocking directorates and organizational effectiveness. The literature reveals inconsistent but		

generally weak relationships between these aspects. Several hypotheses are developed to provide more specific answers on the relationship between interlocking directorates and organizational effectiveness, that currently are being tested empirically.

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ABSTRACT

An interorganizational framework is presented to explore interlocking directorates as a communication and coordination device between interdependent organizations. Interdependence is defined as being either horizontal (between competing organizations) or vertical (between suppliers and buyers). The review specifies relevant dimensions of interlocking directorates, i.e., directionality, strength, directness, simultaneity, and centrality followed by a critical review of pertinent empirical studies on interlocking directorates, their antecedents, and consequences. This review reveals weak and inconsistent findings and suggests several alternative hypotheses to advance the knowledge on interlocks as an interorganizational communication and coordination device.

Interlocking Directorates: An Interorganizational Review

This paper provides an interorganizational review of interlocking directorates.¹ The concept of interlocking directorates denotes the sharing of a director by two organizations so that they are interconnected by a human linking pin. We examine interlocks in reference to organizations and actors in their environment, i.e., at the interorganizational level. Since organizations have limited ability to generate the resources and information to survive they have to enter into exchange relationships with actors in the environment which supplement the products and services that they cannot provide themselves. Organizations are also interdependent because they compete for necessary resources. In the context of the interorganizational division of labor, organizations develop coordination and communication structures to regulate the interdependence among them. In this respect interlocking directorates complement joint ventures, mergers and flows of personnel. Since interlocks are often construed as conspiracy-like phenomena there is a wide spread concern that they benefit the interconnected organizations disproportionately at the cost of public interest (e.g. U.S. Congress 1965; Dooley, 1969; and Pfeffer, 1976).

Interlocking directorates have also been studied on a regional or national level (e.g., Levine, 1972; Bearden et al., 1975; Warner and Unwalla, 1967). The unit of analysis shifts from a set of organizations to the regional or total society. A popular assumption among these studies holds that interlocking directorates represent the cement that binds a monolithic corporate power structure and reveals the existence of a cohesive economical, political elite that dominates political and economic decisionmaking (e.g., Perrucci and Pilisuk, 1971; Lieberman, 1971; -

and Domhoff, 1967). Generally speaking, however, this latter research has little organizational relevance since it does not trace interlocking directorates to the relationships between mutually dependent organizations. It might be relevant indirectly in that being well connected regionally or nationally could enhance accessibility to critical and scarce resources; unfortunately this relevance is not examined explicitly. Many of the empirical studies of interlocking directorates have been fairly a-theoretical. In particular, the studies of the societal level have been rather descriptive. For example, the study by Levine (1972) described as a multidimensional representation of the distances between large corporations where the distances were derived from the intensity of interlocking directorates. Studies by Warner and Unwalla (1967), Bearden et al. (1975), and Mariolis (1977) are also macroscopic and aggregative but come closer to organizational aspects by investigating the frequency of interlocks in reference to different industries and in reference to financial institutions. These studies are more pertinent to the scope of this review paper and to the theoretical proposition that guided this review. The proposition is that interlocking directorates are a coordination and communication device between interdependent organizations. Thus, this paper reviews the literature that examines interlocks as a dependent variable. Since interlock-mediated communication may affect performance and other outcomes, this paper also examines the literature on interlocks as an independent variable for explaining organizational effectiveness.

Organizations: their environment and their effectiveness

In order to further delineate the concept of interlocking directorates, it is necessary to explicate the meaning of interorganizational relationships. In this review, we assume that organizations develop interlocking

directorates to manage interorganizational interdependence. Interdependence is either vertical or horizontal. Vertical interdependence exists among organizations which are located at adjacent stages of a production process. For example steel firms receive iron ore and coal from mining companies and dispose of steel to automobile manufacturers and other customers. A rehabilitation agency receives its referrals from hospitals and financial resources from the government. Horizontal interdependence exists among competing organizations and is best illustrated by the concept of oligopoly where organizations recognize their interdependence because they are relatively few in number and realize that their market behavior affects each other and is observed by each other.

The magnitude of vertical interdependence is a function of the substitutability and criticality of the resources involved. Substitutability refers to the replaceability of the external actor's resources. Criticality refers to the importance of resources in the sense that discontinuation of their flows would quickly and/or severely impede the focal organization's functioning. If a resource is critical for an organization's performance and if there are no adequate substitutes, dependence on organizations from which these resources emanate will be great (Pennings and Goodman, 1977).

The amount of horizontal interdependence is a function of the number of competitors and the similarity of inputs or outputs about which they compete. Unlike vertical interdependence where organizations interact directly the horizontal interdependence is mediated by third parties such as buyers and sellers. Economists employ the degree of concentration of a market, industry or other "action set" (Aldrich, 1977) as an indicator of horizontal interdependence. A concentration index indicates the percent of an industry's total sales or value-added output controlled by the largest (e.g. largest four or largest

eight) firms. If this index is greater than 50, organizations are likely to recognize their horizontal interdependence. If the index is of intermediate level (i.e., the market share of the four or eight largest firms is neither "large" or "small") the competitive interdependence is highest. Organizations in such environments may show somewhat erratic and volatile behavior but it is not stochastic as in cases of pure competition. Their number is also too large to be well understood compared with a highly concentrated industry where any pertinent behavior can easily be decoded (Scherer, 1972).

Under conditions of high vertical and horizontal interdependence organizations will establish interlocking directorates. The meaning of interlocks is rather different in these two cases, however. In the case of vertical interdependence, interlocking directorates can be construed as cooptation/coercion and in the case of horizontal interdependence as "common messengers."

Cooptation was a term coined by Selznick (1949) who noted in his TVA study that organizations confronted by hostile or opposing actors in the environment were able to neutralize their potential disruption by making them part of the decision structure. Whether interlocking directorates represent co-optation or coercion is often impossible to determine; cooptation would imply that the recruitment initiative was vested in the focal organization while coercion would imply that the recruitment originated from the outside actors. The directionality of interlocks, to be discussed shortly may further clarify this issue. Thus interlocks represent a mechanism through which organizations allow relevant outsiders into the internal decision making process of a mechanism by which influential outsiders obtain a foothold in the dependent organization. Therefore, such interlocks may augment inter-

dependence. The resource flow is supplemented by a potential flow of decisional influence--a flow which is institutionalized by a shared director.

The interlocking directorate between competing organizations mitigates their strategic interdependence. As common messengers, they create prior knowledge which enables them to forecast the otherwise unforeseen and possibly disruptive actions of competitors. These actions subsequently become a parameter in an organization's development of new strategies. Such interlocks also enhance the surveillance of implicit collusive agreements and reinforce the propensity toward normative uniformity of competitive behavior.

However, among both vertically and horizontally interdependent organizations we may ascribe a more general function to interlocking directorates. Directors can be seen as occupying boundary spanning roles, sealing off what Thompson (1967) has referred to as "technical core." By absorbing external interferences, the organization can perform as if it is in a near-certain environment. Nevertheless, it is not always clear whether directors perform this function unequivocally. It would appear that most directors are in charge of the internal management of the organization--most notably internal directors who do not have important external liason duties (cf. Mintzberg, 1973).² The management of interorganizational relationships seems to be more salient for those directors who enjoy two or more directorates. These directors are most instrumental for the establishment of favorable exchange relationships with both customers and suppliers or they contribute to the creation of uniform competitive strategies and the monitoring of agreements among competitors. Therefore interlocking directorates can be viewed as critical for organizational success. Katz and Kahn (1966) would classify interlocking directorates as a

strategic device for achieving "political effectiveness." They distinguish this from "efficiency" in which case effectiveness is accomplished through internal conditions (e.g. technology, planning, research and development and other cost improving policies). Political effectiveness is accomplished because the organization manipulates its environment with strategies that ensure favorable exchanges. . Interlocking directorates represent one way through which an organization performs well "politically" even though it may be sub-standard on internal, efficiency criteria. The implication is that well connected organizations have superior effectiveness. Therefore, it is not only of interest to focus on the differential propensity of organizations to rely on interlocking directorates as an interorganizational management device, but also to determine its consequences such as improved effectiveness and greater market power.

The nature of interlocking directorates

In view of the preceeding interorganizational considerations, it is useful to further delineate the concept of interlocking directorates. There are widespread differences in the conceptional and operational definitions of interlocking directorates. At the interorganizational level it is not always clear whether interlocking directorates represent relational ties between organizations or whether they represent nonreflexive, asymmetrical antennae which organizations erect at their boundaries. This paper stresses the relational view of interlocking directorates.

This section reviews the range of dimensions which have been used to describe and measure interlocking directorates, addressing ourselves to several basic issues. These issues include the dual character of interlocks in that they can be construed as linkages between people as well as linkages between

organizations; the multidimensional nature of interlocks; the distinction between simultaneous versus successive interlocks; and finally, the apparent need to move from the organizational to the supraorganizational level of analysis. By reviewing these issues we may alleviate a great deal of ambiguity that presently characterizes research on interlocking directorates.

Interlocks linking people versus linking organizations

There are rather numerous studies which have examined the organizational linkages between people rather than the people linkages between organizations. In an abstract sense, individuals are linked by virtue of their overlapping memberships in two or more organizations, while groups are linked by virtue of their sharing one or more individuals. In a concrete sense, directors are linked by virtue of their multiple board memberships while organizations are simultaneously linked since they share directors. This duality of interlocks was well conceptualized by Breiger (1974) as the "intersection" of persons within groups and of groups within the individuals. The overlap between two boards of directors due to a common individual coincides with the overlap of multiple affiliations in the connecting individual; hence, the intersection.

This intersection makes the concept of interlock sometimes problematic. It would not induce any ambiguity when the only groups involved were boards of directors, but often a director's membership is not limited to two or more boards. He is also a member of other groups, clubs, families, and organizations. There are several studies which have examined the interorganizational ties where the linkage was not established by individuals but by the primary groups to which they belonged (e.g., Braam, 1974; Knowles, 1973; Bonacich and Domhoff, 1977). Knowles (1973), for example takes families

rather than their members as the linking mechanism and tries to demonstrate that families enjoy easy access to economic and other resources, by virtue of their linking a large pool of organizations. Similarly, there may be network cliques that interlock the organizations. It may be difficult to draw the boundaries of such cliques since it requires additional information on the individuals before it is possible to ascertain the existence of relatively exclusive and cohesive sets of individuals. It is only after one has established unequivocally the existence of cliques that it becomes possible to refer to clique interlocks rather than to personal interlocks. One could invoke the concept of a strong versus a weak tie (Granovetter, 1973) to identify cliques. A clique is a set of individuals who are strongly tied; strength can be measured by a total of the amount of time, emotional intensity, intimacy, and reciprocity (Granovetter, 1973: 1361). To this we may add the sharing of common resources or interests. An important idea in this concept is that the stronger the tie between two individuals, the larger the proportion of other individuals contained in a subset which ties to one or both of the individuals to whom the individuals will both be tied. In other words, if A has a subset S_1 with whom he is tied and B has another subset S_2 with whom he is tied, then the stronger the tie between A and B, the greater the proportion of individuals in $S_1 + S_2$ with whom they both will be tied. Thus it is evident as to how interlocking directorates can lead to a macrostructure. This macrostructure is formed by weak links that tie well-defined groups formed by strong links.

To the extent that background information on interlocking directors is available, it should be possible to detect cohesive sets of interlocking directors. For example, data may be available on club membership, educa-

tional background, geographical location, and investment portfolios which can supplement data on interlocks per se (Lupton and Wilson, 1959; Clement, 1975; Domhoff, 1967; Perrucci and Pilisuk, 1970; Gogel et al., 1976). This enables the differentiation of interlocks into those that are strong versus weak or intermediate. Such data may then lead to more refined hypotheses. The most obvious hypothesis is that cohesive cliques of directors are relevant interorganizationally in that being intersected into such a clique enhances the organization's integration into an information-resource network.

Granovetter's ideas, however, suggest an alternative hypothesis indicating that the weak interlocking directorates are also critical in that they are the bridges into areas that are beyond the organization's domain, but which could provide supplementary information and resources. A weak interlock is a director who represents the only path between two organizations; a strong interlock in contrast will be paralleled by additional paths between two organizations because his clique provides second- or n-degree linkages between them. A weak interlock is therefore more likely to link an organization with organizations that are beyond its domain. Exposure or access to strange and foreign domains may facilitate the diffusion of innovation and development of alternative paths for resource acquisition.

The duality problem is not likely to be resolved easily because ambiguities remain about the definition of group boundaries and the identification of strong or weak ties. It is not sufficient to apply network- or graph-theoretical analysis to interlock data to detect organizational or director cliques, because the existence of such cliques is often a function of the graph-theoretical algorithm and the subjective interpretation of results. It is necessary to supplement such data with archival background information or interviews.

Generally, there has been little study of interorganizational relevance of network clique detection. Those studies that do exist satisfy themselves with uncovering network configuration where the unit of analysis is a set of regional or nationwide organizations. The detection of cliques graph theoretically becomes a source of inference for influence patterns. For example, Levine (1972) using a multidimensional scaling technique (smallest space analysis) compressed interlock data into a three-dimensional space in which financial institutions found themselves centrally located in the alleged "sphere of influence." In this connection it is ironic to note that Levine (1976) later retracted his conclusions about a well-established "sphere of influence." Randomly assigned graphs are surprisingly successful in generating network configurations. Levine invokes the imagery of a social engineer who is charged with constructing such a sphere and who would be rather busy forging corporate interlocks before his structure would exceed one that could be extracted from a set of randomly generated graphs. From an interorganizational perspective, therefore, it would seem that macroscopic studies address the wrong questions about the existence of interlocking directorates, their interorganizational antecedents, and their consequences. Ideally, research at the interorganizational level should identify cliques bases on strong ties and relate them to patterns of interdependence.

Dimensions of interlocking directorates

The discussion on weak and strong ties suggests that one should be explicit about the dimensions which characterize interlocking directorates. It is not sufficient to limit interlocks to the notion of linkage per se but one should also include the directness, directionality, and intensity of linkages in addition to the strength. Awareness of such dimensions may also elucidate the interorganizational antecedents of interlocks, especially the strategic

flavor of developing linkages between horizontal and vertical organizations.

A "direct" interlock is said to exist when two organizations share a director so that they are directly interconnected. Graph theoretically (Harary et al., 1967) a direct interlock is a single direct path between two organizations. In contrast, an indirect interlock exists when two organizations are linked by paths through one or more intermediate organizations. Thus potential communication channels, that are not directly observable, can exist indirectly. Although indirect interlocks may be less relevant interorganizationally, they can be relevant in reference to the joint consideration of vertical and horizontal interdependence. Representatives of relevant, vertically interdependent organizations may function as common messengers (i.e., indirect interlocks) for competing organizations which are strategically interdependent.

The dimension of directionality is easy to conceptualize but largely is an indeterminate measure. Assuming that the recruitment of board members is based on rational decision making, one can conjecture that interlocks are developed strategically for the asymmetrical exchange of information which in turn may imply a directionality of influence. The asymmetrical interlock may also indicate the direction of net influence between two organizations.

In most cases, board members are recruited by the management of the focal organization (Pfeffer, 1972). If this recruitment is viewed as a co-optation strategy (as Allen, 1974, does) in order to regulate vertically interdependent organizations, there seems to be an assumption that the direction of interlocking will be toward the co-opting organization. However, Bearden et al. (1975) and Breiger (1974) conceptualize the directional tie in the opposite direction, i.e. from an organization with which a person has primary

affiliation to the organization in which that individual is secondarily affiliated. In this viewpoint, the central idea is that the sending organization perceives a critical functional relationship with the receiving organization and therefore "coerces" the receiving organization to tolerate this arrangement. This viewpoint is rather useful. The directionality of the influence is contingent upon the antecedents of the interlock; these antecedents are particularly pertinent with respect to vertical relationships. It is therefore mandatory not to make the assumption that interlocks are reflexive (i.e., the link from A to B is identical to the link from B to A). One could assign different weights to directional interlocks. Bearden et al. (1975), for example, assigned 90 percent of the officers-directors link to the sending company and 10 percent to the receiving company. If the interlock is neutral with respect to the affiliations of the two organizations, there is no need for differential weights; but if a person is employed by any one of them, we should give more weight to the sending organizations. Therefore, it is desirable that interlock researchers do not confuse co-optation by the focal organization with coercion by organizations in its environment. While co-optation and coercion are typically processes between vertically interdependent organizations, we may hypothesize that co-optation is likely when dependency is tilted in favor of the focal organization and coercion when dependency is tilted in favor of the supplying or buying organization. Such dependency is a function of the criticality and substitutability of the resources (Pennings and Goodman, 1977).

The dimension of strength has already been discussed in the context of director-clique detection. It is important not to confuse tie strength with

tie directionality as they represent two independent concepts. For example, Bearden et al. (1975) characterize strong interlocks as ones that are "direct" and involve only corporate officers and/or directors of the sending organization in relation to the receiving organization. Their view is that the main role of the director of the sending organization is to represent that organization to the receiving organization. They conclude that clusters formed by strong ties represent a grouping of economic connections, whereas weak ties reflect an overall common orientation and interest.

Our view of the strength is more comprehensive than these. If we view a tie as a vector in Euclidean space, then that tie will have properties of both directionality and strength. In the case of corporate interlocks, the magnitude or strength of the tie is a function of the intensity of the tie and the centrality of the organization with which the focal organization links. In other words if $A \rightarrow B$, then this link is stronger if the intensity of the tie is high and B is a highly central organization.

In turn, this definition requires a definition of intensity. Ties will tend to be more intense if they involve a greater portion of board members from the secondary organization relative to the focal organization. For example, an intense tie would be illustrated by a bank member sitting on a relatively small board of directors (proportionality factor) of a financially dependent organization.

Directionality of interlocks has to be distinguished from the concept of composition of boards of directors (Pfeffer, 1972; Helmich, 1977). The composition of a board can be broken down into those who are insiders and outsiders while the proportion of outsiders can be further broken down into subsets of directors coming from various types of organizations. It is important to realize that interlocks represent a relational phenomenon

involving two or more organizations while board composition does not have this relational connotation. The latter concept is biased toward a focal organization's perspective and tends to have a one-sided view of interlocks. An "outside" director may be the result of either a co-optation or a coercion maneuver and fails to identify the implied directionality. The directionality of interlocks may reveal whether directors were recruited by management (which seems to be prevalent) or whether they were imposed by powerful outside organizations. In the latter case it obviously does not make much sense to invoke the notion of co-optation, nor can it be construed as a volitional strategy on the part of the recipient organizations. Thus it would seem that studies of board composition are deficient in dealing with the direction of interorganizational influence flows.

Simultaneous versus successive interlocks

Virtually all research on interlocking directorates deals with simultaneous linkages: directors who occupy two or more board positions at the same time. There are also, however, linkages which have been established over time through transfer of people--for example, cabinet members or employees of regulatory agencies who at the termination of their tenure join boards of directors, or senior management officers who join the boards of competitors after their retirement (e.g., Freitag, 1975; Baty et al., 1971). These dynamic or successive linkages have probably less utility for managing interorganizational relationships because such imported directors are prone to lose credibility and familiarity in the departing organization and to become too loyal to the recipient organization so that they are no longer useful in ensuring the organizational support and legitimation. If we limit successive linkages to directors per se, it is even more likely that departing directors

will lose their communication role because directors are among the most marginal members of the organization.

Organizations versus supraorganizational collectivities

Finally, the research and debate on interlocking directorates has been plagued by an uncertainty about the proper unit of analysis. This issue has been elucidated by Hirsch (1975) who suggests that organization-environment research has to shift to an interorganization or institutional level when the focus is not only how organizations relate to their environment, but also how collectivities of organizations reveal phenomena that cannot be studied from the vantage point of individual organizations (Hirsch, 1975: 8-9). Such collectivities include whole industries or organizations and agencies organized around specific products, and services.

The research on interlocking directorates has also oscillated between individual organizations and organizational collectivities. Earlier reference was made to studies with an organizational vantage point dealing with composition of boards of directors (e.g., Pfeffer, 1972) versus other studies that have adopted an interorganizational vantage point as illustrated by Aldrich (1977) and Bearden et al. (1975). Typically, these latter studies try to measure the centrality of an organization in an interorganizational network or within an "action set" (Aldrich, 1977). Centrality refers to the number of steps that an organization has to go through in order to reach any organization. This concept requires a recursive definition since it has to be defined in dimensions that are pertinent to a supraorganizational level, i.e., an interorganizational network. Based on Bonachick's work (1972), Bearden et al. (1975) argue that centrality depends on the intensity of the interlock, the number of organizations with which it interlocks, and the centrality of these firms. Back to the earlier mentioned bank example, the

centrality of the bank in a community network of organizations is enhanced if that tie to the organization receiving the loan is intense and this receiving organization enjoys a high degree of centrality. The popular but untested hypothesis suggests that highly central organizations are found when horizontal and vertical interdependence is high; furthermore, such organizations may enjoy a higher level of "political effectiveness" (Katz and Kahn, 1966).

In summary, we have specified interlocking directorates as human linking pins between organizations whose most salient aspects include strength, directness, directionality, intensity, simultaneity, and centrality. These dimensions may shed further light on interlocking directorates as a coordination device.

Empirical correlates of interlocking directorates

The objective of this section is to review and contrast pertinent empirical studies on interlocking directorates. This may help clarify the present conceptualization of determinants and dimensions and to delineate their strengths and weaknesses.

The problem in making comparisons is to represent a selected set of papers accurately and fairly. To make an adequate selection, we have tried to limit ourselves to studies that make explicit statements on horizontal and vertical relationships between organizations. Excluded were papers describing and analyzing interlocking directorate data where the unit of analysis has not been specified or where it is a geographical or national entity (e.g., Levine, 1972; Freitag, 1975; Laumann and Pappi, 1973; and Perrucci and Pilisuk, 1970). Table 1 lists five studies that have examined interlocking directorates in reference to competing organizations and eight studies which have examined the frequency of interlocks in reference to

vertical interdependence. These studies were selected after a thorough search of the economic, political science, and sociological literature that has organizational relevance. Many studies were excluded because they did not focus on interorganizational antecedents of interlocking directorates or because they focused on a geographical (mostly national and societal) unit of study.

Table 1 lists the studies in alphabetical order and briefly identifies the nature of the independent variables, followed by four columns corresponding with four previously discussed dimensions. The centrality and simultaneity dimensions were omitted since none of the studies has dealt with them in an interorganizational context. Instead, we have listed a unit of analysis column identifying the primary level of aggregation that each of the studies deals with. Finally Table 1 lists those outcomes that are most salient from the perspective of this review paper.

Horizontal Studies

Among the studies which have focused on horizontally interdependent organizations, there is only superficial evidence on the relationship between competition and interlocking directorates. The widely quoted studies by Dooley (1969) and Warner and Unwalla (1967) satisfy themselves with acknowledging that interlocks do occur among competitors: approximately one-eighth of all direct interlocks are between competing organizations. The study by Fennema (1974) is exemplary due to his concern for the multifaceted nature of interlocking directorates, but in his case study of the car industry in Europe he did not find any evidence in favor of the assumption that relatively many linkages exist between competing firms. Pfeffer and Nowak (1976) are exemplary in their measurement of horizontal

interdependence by measuring the concentration ratio of the industry. Unfortunately, however, they did not obtain interlock data, but restricted themselves to board composition measures which earlier were qualified as being nonrelational; at the most they reflect antennae that receive, transmit, and disseminate information from the external environment. Pfeffer and Nowak (1976) found that the proportion of outside directors was highest when the concentration of the industry is of an intermediate level. Their study presents another ambiguity that pertains to the unit of analysis. While board composition is an organizational attribute, the independent variable was measured as an attribute of the next higher aggregation level. Since their concern is for the "institutional level of management" (Pfeffer, 1976), it seems appropriate to identify their unit of analysis as boards of directors rather than industry. Knowles's (1973) study complements the two earlier studies. Although he was more concerned with intrafamily linkages, he showed that belongingness to a family allows for a classification of weak and strong ties. In this respect, Knowles nicely illustrates the nature of network clique interlocks as distinct from the individual interlocks. When applied to the petrochemical industry, it was found that the set of firms that was well tied showed a greater amount of product duplication than a set of firms that was weakly tied. Product duplication exists if two firms manufacture the same product such that they jointly own a larger share of the market. Market share in turn may affect their market power, i.e., their ability to affect parameters of the market such as price and quantity. Knowles's results are of restricted generalizability in that he limited himself to a single case: the petrochemical industry. Likewise, Fennema's (1974) case study of the European automobile industry is of limited generalizability.

Ideally we should now embark upon research that compares sets of strategically horizontally interdependent organizations and the preponderance of interlocks among them where interdependence is measured by concentration of industry and interlocks are measured with respect to their four dimensions. The most important dimension, directionality, has been ignored by the five studies of Table 1, perhaps because it has been hypothesized that this dimension is more salient among vertically interdependent organizations. Nevertheless, research should determine whether there are directionality patterns among horizontally interdependent organizations since this may enhance insights about the strategic, competitively motivated choice of directors.

Vertical studies

Among the so-called vertical studies, there is a strong tendency to focus on the relationship between financial institutions such as banks and the firms who have to rely on them to obtain access to the capital market. As Table 1 shows, there is only one study (Fennema, 1974) which has focused on nonfinancial interdependence; i.e., the interdependence between automobile manufacturers and the suppliers located at previous stages of the production flow.

The preferred or imposed focus on financial interdependence may be due to the accounting practices which limit themselves mostly to reporting financial information. There is generally no data on interdependence between other types of buyer-seller relationships. Pugh et al. (1969) take the volume of business with the largest supplier and customer, but such data are incomplete and often unavailable (Mindlin and Aldrich, 1975). At the aggregate level there are input-output tables indicating the aggregate

demand and supply from one type of industry to another, but such data may be at variance with the actual demand-supply among individual organizations. In view of the scarcity of such data and the abundance of financial data, it is not surprising that the small number of relevant studies on vertical interdependence have dealt with financial interfirm transactions.

From Table 1 it can be seen that these studies have relied on indices of capital structure. These indices reflect the reliance of a firm on outside financial sources. The greater the volume of long-term and/or short-term debts relative to shareholders' (or owner's) equity, the higher the dependence; conversely, firms that rely on internal financing enjoy a great deal of independence. Some of the studies have a "crude" index such as the debt-equity ratio, "crude" because it combines all forms of external debt obligations including short term and long term (e.g., Allen, 1974; Pfeffer, 1972; and Helmich, 1977). The debt-equity ratio is somewhat deficient since it amalgamates all outside sources of financing. It is also critical to incorporate the firm's size since small firms are more likely to rely on long-term bank loans while large firms have more options; for example, they can issue bonds for long-term financing thereby bypassing interorganizational resource dependence. Likewise, capital intensity (e.g., Allen, 1974) should be classified as an inadequate indicator of external debt dependence. One should have detailed knowledge about a firm's capital structure before inferences are made about reliance on the external capital markets. It is likely that dependence on banks and other financial institutions will be larger where capital intensive firms have a higher debt-equity ratio. Finally, it is important to adjust for types of industry since firms in one type of industry

show a much faster turnover of inventory than in other types of industry (compare retail with fast turnover versus steel with slow turnover).

Fast-turnover industries rely heavily on short-term financing.

The issue of short-term versus long-term capital requirements has instigated some researchers to develop measures of short-term vertical interdependence (e.g., Dooley, 1969; Gogel et al., 1977). These authors have developed solvency measures such as the acid test ratio which represents a firm's cash, marketable securities, and receivables divided by current liabilities. Solvency is likely to be a very sensitive measure of a firm's dependence on short-term resources. Unlike inputs such as labor and raw materials, credit from different sources is highly substitutable; solvency measures, however, reflect a high degree of criticality (Pennings and Goodman, 1977).³ Criticality refers to both the speed and severity of impact originating from an organization in the focal organization's environment. Organizations with poor solvency are likely to be at the mercy of the providers of short-term credit and are bound to be subjected to external inputs in defining organizational policy and strategy, i.e., suppliers of short-term capital are likely to become external constituencies that make claims on the focal organization. Thus we would expect that such organizations try to obtain representation in the form of directional interlocking directorates.

Unfortunately, however, most studies of Table 1 fail to deal with directional ties. The only study that does so (Bearden et al., 1975) fails to provide data on capital structure, but points to local organizational clusters (such as those centering around Pittsburgh, Pennsylvania) with anecdotal evidence about financial interdependence. All other studies

of Table 1 ignore directional ties so that evidence corroborating the above expectation on directionality and solvency does not exist.

Apart from the study by Bearden and his colleagues, there is only a study by Fennema (1974) on European organizations that has paid attention to the multidimensional nature of interlocks. Fennema found that the number of direct interlocks as well as the intensity was highest for the linkages between automobile and metal industries. As stated before, his contribution is the only study that deals with nonfinancial resource exchanges; however, it does not present interdependence data on firms belonging to these two industries or "product branches."

All other studies have related rudimentary measures of interlocking directorates to indices of capital structure, and as the last column of Table 1 indicates, the evidence in favor of a hypothesis about the relationship is weak and fairly insignificant. Allen (1974) and Pfeffer (1972) correlate debt-equity ratio with a number of interlocks and number of outside directors, respectively. Allen finds a weak negative association while Pfeffer's results are rather insignificant. Allen was puzzled about the negative association, but as indicated before, debt-equity ratio is too crude to specify the interdependence between banks and industrial, utility, and other types of firms. Perhaps banks and other suppliers of capital avoid firms that have high and excessive debt-equity ratios; however, the crude nature of the debt-equity ratio makes it difficult to speculate. Pfeffer (1972) found a significant rank-order correlation between percentage of directors from financial institutions and debt-equity ratio (i.e., $\rho = .24$, $p < .04$), but he defined financial institutions liberally and included stock brokerage firms and investment brokers as well as banks.

It is necessary to examine types of interlocks in reference to different indicators of capital structure while controlling for size, type of industry, and capital intensity.

The negative relationship between solvency ratios and financial interlocking directorates as revealed by Dooley (1969) and Gogel et al. (1976) suggests that financial institutions are active in establishing interorganizational linkages with respect to firms that financially are not solvent. It is of interest to note that Dooley did not find a significant effect when the analysis was based on the total sample. However, when the sample is decomposed and the analysis is restricted to utility firms, there is a substantial negative effect of acid test ratio and a positive effect of total assets on the number of financial interlocks. This suggests that the frequency of financial interlocks increases as capital intensive firms such as "utilities" become less solvent and as their assets become larger. The magnitude of the effects of vertical interdependence, however, is too small to signal major support for the hypothesis on vertical interdependence. It seems probable that the predictive ability will be improved if due attention is paid to the multidimensional nature of interlocking directorates, provided the analysis controls for the earlier mentioned variables such as capital intensity and industry characteristics. Such innovations might move research on interlocking directorates beyond the state of description and remove the prejudices, if any, on the interorganizational significance of interlocking directorates.

Interlocking directorates and organizational effectiveness

While research on antecedents of interlocking directorates appears to accumulate evidence, there is surprisingly little systematic research on the consequences of interlocking directorates. As indicated before,

interlocking directorates may be instrumental in enhancing organizational effectiveness. Well-interconnected organizations have better access to resources than do poorly interconnected ones and subsequently we may find differences in effectiveness. Horizontally interdependent organizations that enjoy interlocking directorates have a greater ability for collusion and for reduction in competition. U.S. legislators clearly believe that interlocking directorates reduce competition and benefit vertically interdependent firms disproportionately (e.g., U.S. Congress 1967, 1968). There are also opposite views. Stigler (1968), for example, argues that interlocking directorates are a clumsy technique for coordinating the activities between two firms so that their presence has no significant effect on competition.

Whether interlocking directorates reduce competition or integrate vertically interdependent organizations more efficiently may be difficult to determine. There is not only the problem of measuring the interlocking per se but also the need for information about the coordination process between organizations. Such information is not usually available since it is highly sensitive and confidential. Compared with the quantitative techniques for analyzing interorganizational structure, there is virtually no attempt for measuring and analyzing process. The research by Mintzberg (1973) is pioneering but limits itself primarily to internal organizational processes. There are historical case studies (e.g., Stern, 1976) which have explored the archival data, thereby uncovering outcroppings that reveal parts of interorganizational communication processes. Stern (1976), for example, was able to reconstruct the flows of information among banks in Bismarck, Germany, and showed that these flows were more efficient than those of the formal diplomatic networks. At this stage such ideographic research may be

more appropriate than quantitative network research that imputes the existence of interorganizational influence and/or communication flows without corroborating it with data on influence or communication processes.

There are numerous studies that impute a power or control relationship without providing evidence. Earlier reference was made to macroscopic studies (e.g., Levine, 1972) which made unwarranted assertions about the "sphere of influence." At the interorganizational level there is, for example, the research by Gogel et al. (1976) which construes the relationship between solvency and interlocking directorates as evidence for the "Finance Management Control Model." According to their reasoning, the management of the firm will be allowed to enjoy a great deal of autonomy, but their "model" also asserts that basic decisions such as stock issuance, dividend payouts, acquisitions, and mergers "will tend to be decided, or at least supervised, by dominating outside financial institutions" (Gogel et al., 1976: 22; emphasis added).

While such armchair evidence is abundant, there is virtually no empirical evidence on the relationship between interlocking directorates and organizational effectiveness or interorganizational decision making. Pfeffer's study (1972) in Table 1 is the only investigation on the consequences of interlocks. Pfeffer found that the discrepancy between a firm's predicted and actual percentage of inside directors was not related to income as a function of sales nor as a function of equity. The predicted scores were derived from a regression equation where the independent variables were the size of the firm, the debt-equity ratio, and two dummy variables indicating whether or not the firm was nationally and regionally regulated. Since there are large differences between industries, Pfeffer (1972) supplemented the analysis with an industry-specific perspective. The performance measures

were standardized with respect to the industry to which a firm belonged. Pfeffer found that the deviation from the predicted percentage of inside directors correlated respectively with the degree to which a firm deviated from the mean performance of firms belonging to its industry. The correlations were -0.30 (income-sales) and -0.295 (income-equity). This research provides modest support for the contention that organizations that develop an optimum number of outside directors tend to be superior on "political effectiveness" (Katz and Kahn, 1966). There are only two other studies that have tried to find effectiveness correlates of interlocking directorates, and they were unsuccessful in accomplishing this (Bunting and Liu, 1977; and Blankenship and Elling, 1962). Bunting and Liu found a very strong relationship between size (measured by total assets) and interlocking directorates for some types of industries (e.g., basic processing and machines and equipment) but were unable to detect a relationship between interlocks and return on assets even though their analysis was industry specific. Furthermore, they compared data over seven time periods. Blankenship and Elling (1962) who studied nonprofit organizations attempted to relate hospitals which are "central" in a local interorganizational network to the community support they received. They could not find any support for the hypothesis that strongly tied hospitals enjoyed more community support (in dollars per bed).

It appears that evidence about interlocking directorates as devices for reducing competition and improving vertical coordination is extremely scarce and inconclusive. Perhaps it is more useful to employ case methods, participant observations, congressional hearings records, and archival sources to obtain pertinent data so that the interorganizational processes are not

treated as a "black box." It is also desirable to combine research on the antecedents and consequences of interlocking directorates such that effectiveness or other outcomes are not traced only to the presence or absence of interlocks but also to the interorganizational conditions that lead to the propensity to develop interlocking directorates.

Conclusion

This review has tried to make an inventory of critical issues that surround the research on interlocking directorates at the interorganizational level. It has argued that organizations develop interlocks either to manage competitive or vertical relationships and has identified several dimensions of interlocks that have to be considered before an adequate assessment of interlocks as a coordination device can be made. These dimensions include directness, directionality, strength, simultaneity, and a derived dimension, centrality. This was followed by a review of the empirical literature dealing with horizontal and vertical interdependence and interlocking directorates. Since most of this research is oblivious to multidimensionality, there remains a big gap about testing this relationship. There is weak (and occasionally contradictory) evidence suggesting that vertical, financially interdependent organizations are more prone to develop an interlocking directorate. The information on horizontally interdependent organizations is even more scarce, but circumstantial evidence suggests that the higher the concentration of an industry, the greater the frequency of interlocks and the higher the organizational effectiveness.

In view of such rather negative conclusions one may be inclined to discourage any new attempt to conduct research on interlocking directorates. However, the earlier mentioned deficiencies as well as the failure to develop

viable alternative avenues of research would suggest that there is much room for fruitful research. By alleviating the deficiencies in research and by adopting an explicit interorganizational framework, it should be obvious that several hypotheses still await empirical testing.

Ideally, future work should be based on research designs that jointly consider information on interorganizational interdependence, interlocking directorates, and organizational and interorganizational outcomes such as effectiveness. These designs are different depending on whether the question deals with horizontal or vertical interdependence. It is also apparent that the unit of analysis is to be different. Vertical interdependence is primarily pertinent to dyads of organizations that exchange resources. Naturally, the aspect of substitutability suggests that other organizations can replace actors in the focal organization's environment and should therefore be considered for the measurement of vertical interdependence, but the primary focus is on actors such as suppliers and buyers vis-a-vis the focal organization. In contrast, horizontally interdependent organizations are typically elements of a set of organizations such as a community chest or a two-digit industry. The interlock antecedents in the first case are to be attributed to dyad characteristics, while in the latter case, aspects of the organization as well as the horizontal set it belongs to have to be considered.

Interdependence between competing organizations may be measured along the ideas of Pfeffer and Nowak (1976) who computed the deviation of an industry's four-firm concentration ratio from the mean concentration ratio of all industries. However, unlike Pfeffer and Nowak's research, future research should examine the asymmetrical relationship between the deviation index and the frequency of interlocking directorates with competitors. It

is reasonable to hypothesize that the propensity toward interlocking decreases at a much faster rate for firms in industries whose concentration ratio is more than average and at a slower rate for firms in industries which are less concentrated. This expectation is based on the assumption that in highly concentrated industries there is a comparatively smaller need for interlocking directorates since the number of firms allows for an easier decoding of their behavior. The decoding of a firm's behavior is more problematic in industries with less than average concentration ratios, and therefore we postulate an asymmetrical relationship between concentration deviation and frequency of interlocking directorates.

Although the direct linkages between competing organizations are most salient, it has already been suggested that, in addition, indirect interlocks as common messengers may facilitate the communication between them. Therefore, the multitude of measures reflecting the multifaceted nature of interlocking directorates should include directness. Also, since the unit of analysis may move from the organization to the next higher level of analysis, the interlock measures should include centrality as both direct and indirect interlocks may enable the transfer of information among competitors. Research at this higher level of analysis may also delineate the existence of strong versus weak interlocks and the uncovering of network cliques. Earlier it was suggested that weak ties might be significant inter-organizationally; it is interesting to compare strongly tied firms which differ in their utilization of weak interlocks. Perhaps strongly tied firms with many weak links outperform strongly tied firms with only a few weak links. The first type of firms may be more successful in their diffusion of innovation; they may also be the most effective from a long-term perspective.

Since vertical interdependence is more salient for dyads of organizations, the graph theoretical centrality of an organization in a network seems to be less relevant. It is essential, however, that data are available on directionality and intensity. If vertical interdependence is measured with capital structure indices--which appears to be the most feasible strategy for measuring this type of interdependence--we can develop a one-equation model. The measures of interlocking directorates can be related to a firm's size (assets), capital intensity, solvency ratios and other measures of external debt requirements, the concentration of the firm's creditors, and the firm's industry classification. The concentration of creditors is pertinent as highly fragmented, and divided suppliers of capital are less likely to obtain directional representatives on a firm's board of directors, nor are they likely to be intense. In contrast, if there are a few major suppliers of capital we may expect mutual awareness among them and therefore a greater likelihood of directional interlocks. This equation also should include industry classification in order to circumvent the earlier mentioned difficulty of comparing firms belonging to widely different industries.

As the review has indicated, it is also of interest to examine the consequences of interlocking directorates. Following Pfeffer (1972), research should investigate the relationship between the algebraic difference between actual and predicted difference in interlocking directorates which subsequently can be related to indices of organizational effectiveness and other consequences such as reduction in competition and improved efficiency in transactions between organizations. It is conceivable, however, that the relationship between frequency of interlocking directorates and organizational effectiveness is not always recursive. For example,

in the case of dependence on external capital markets, feedback about poor performance may result in greater external representation on the board of directors. It requires time-series data to determine whether the relationship between interlocking directorates and effectiveness requires a recursive or a nonrecursive analysis strategy and interpretation.

When research would follow such roads, it may advance our understanding of the role and function of interlocking directorates. Ideally, such research should be complemented by investigations of other types of inter-organizational structure and process, including mergers, joint ventures, and flows of personnel. This research might then eventually accumulate into a body of knowledge that will result in a more general and more encompassing theory of interorganizational relationships. This research should be relevant for economic as well as noneconomic organizations. Such a theory also will be useful for the management of interorganizational relationships from a public policy point of view, for example, by delineating the proper role of regulatory agencies. Hopefully, research on interlocking directorates becomes more cumulative so that it can contribute to these new trends in research and policy.

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Table 1. Overview of studies on interlocking directorates as a function of horizontal and vertical interdependence

Study and independent variable	Directness	Directionality	Strength	Intensity	Unit of study	Main result
A. Horizontal interdependence						
Dooley (1969) (Competing organizations)	-	-	-	-	Linkage	One-eighth of all interlocks are between competing organizations
Fennema (1974) (Firms of product branch)	+	-	+	+	Linkage	Relatively few connections between competing organizations
Knowles (1973) (Competing organizations)	-	-	+	-	Petro-chemical industry	Well-tied firms engage more in product duplication
Pfeffer and Nowak (1976) (Concentration of industry)	-	-	-	-	Board composition	Proportion of outside directors is highest for intermediate concentration
Warner and Unwalla (1967) (Competing organizations)	+	-	-	-	Linkage	Results similar to Dooley
B. Vertical interdependence						
Allen (1974) (Capital intensity and debt-equity ratio)	-	-	-	-	Linkage	Weak to negligible relationship with number of financial interlocks
Bearden et al (1975) (Banks-industrial firm relation)	+	+	+	+	Dyad, cluster	Bank centrality is mostly a local phenomenon
Daems (1977) (Capital intensity)	-	-	-	+	Linkage	Very high frequency of interlocks between banks and industrial firms
Dooley (1967) (Acid test ratio)	-	-	-	-	Linkage	A weak negative effect on the number of financial interlocks for utility firms only
Fennema (1974) (Product column)	+	-	+	+	Linkage	Density of linkages between car and metal industries is

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Fennema (1974) (Product column)	+	-	+	+	Linkage	Density of linkages between car and metal industries is

Table 1 - continued

Helmich (1977) (Debt equity ratio)	-	-	-	-	Board composition	Moderate negative relation- ship between independent and dependent variable.
Pfeffer (1972) (Debt equity ratio)	-	-	-	-	Board composition	Proportion of inside directors is not related to independent variable
Gogel et al. (1976) (solvency rate)	-	-	-	-	Linkage	Weak negative relationship with number of financial interlocks.

* + Issue is addressed

- Issue is not addressed explicitly.

Footnotes

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2. This paper does not deal with the traditional view of the role of directors as monitors of major management decisions or as representatives of stockholders' interests. This view is well expressed by Koontz (1967); Mace (1972); McGougal et al. (1969); Vance (1968); and Zald (1969).
3. It is of interest to note that recent literature in financial economics has been dominated by the so-called irrelevancy hypothesis (e.g., Modigliani and Miller, 1971). This hypothesis holds that from a financial perspective debts and equity are substitutable; capital markets operate efficiently and are neutral with respect to any capital structure profile. The market value of a firm is independent of its capital structure. If changes in the debt-equity composition lowered the firm's value, then by buying up its shares, individuals could realize it as arbitrage profit. Such profits are inconsistent with economic equilibrium and the value/returns from different debt-equity compositions must be similar. However, if a firm's debt level increases, so does the bankruptcy risk, and we should expect that beyond a certain threshold, this risk implies a pronounced influence of providers of capital. This influence is a function of the performance level of the organization as reported by management and the concentration of debts among external actors.

December 12, 1977

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- 41. Air University Library/LSE 76-443
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- 42. Office of the Deputy Chief of Staff
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- 43. Chief, Plans & Operations Office
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